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UW-Madison study connects lower crop diversity with declining bee populations

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A recent study from UW-Madison researchers draws a connection between declining crop diversity and dwindling bumble bee populations in the Midwest.

Previous research has shown that the number of different bumble bee species in the region has decreased over the past century as more land has become dedicated to farming. The new study shows that most native bumble bee species across six Midwest states saw population declines while the average number of different crops grown in those areas also decreased.

Bumble bees, along with other types of bees and insects, play an important role in pollinating various plants including agricultural crops, which make up a major portion of Wisconsin’s economy.

As scientists around the world have documented declining bee populations, many have raised the alarm about potential impacts on the sustainability of cultivated food sources.

“Our findings suggest that insect conservation and agricultural production may be compatible, with increasing on-farm and landscape-level crop diversity predicted to have positive effects on bumble bees,” study authors wrote.

The study, published last week in the journal Ecology Letters, included data from Wisconsin, Minnesota, Iowa, Illinois, Michigan and Indiana. Using multiple historical datasets, the researchers examined 13 native bumble bee species across 535 counties in those six states.

They found that of those 13 species, seven have decreased in number compared to 130 years ago, while the amount of land dedicated to crops has “increased modestly.” The larger change, according to the study, was that the average number of crops grown in these counties was cut in half, from 12 to six. The other six species saw little change or a slight increase over time.

Jeremy Hemberger, now a postdoctoral fellow at the University of California Davis, contributed to the research while attending UW-Madison as a graduate student. He explains in a release that some of the bee species “seem to be more resilient” to the changes that farming has wrought on the landscape.

“The ones that are doing well, they’re generalists,” he said in a UW-Madison release. “They feed on a lot of different plant species, especially those associated with agriculture like common weedy flowers.”

Along with growing a smaller number of different crops, farmers have changed their practices in many other ways over the study period. That includes changes in pesticide and fertilizer use, increasing farm sizes, using genetically modified crops and more.

All these factors likely had some impact on bee populations, but the study authors argue that “diversity and abundance of flowers in the landscape is most likely the dominant contributing factor” the release shows.

The researchers also note the trend toward cultivating fewer crops at larger volume is due to industrialization, changing diets as well as federal agricultural policies.

“The policies that we’ve put into place that have focused on increasing crop production have also pushed consolidation and have made our systems really sensitive and fragile,” said study author and UW-Madison Professor of Entomology Claudio Gratton. “In our effort to be more efficient in agriculture, we’ve made ourselves less resilient.”

See the full study here: http://onlinelibrary.wiley.com/doi/abs/10.1111/ele.13786